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iSXM™ 101 XENIX 86 EXTENSION MODULE INSTALLATION GUIDE AND XENIX 86 OPERATING SYSTEM INSTALLATION INSTRUCTIONS

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PREFACE

This installation guide provides the information necessary to install the iSXM 101 Extension Module hardware into an Intel System 86/330A or a System 86/380. It also contains jumper configurations for optional memory boards, and instructions for installing Xenix 86 software onto the system.

SAFETY PRECAUTIONS

Never attempt to service any sub-assembly within a chassis with the AC power cord connected. Hazardous voltages are present within the chassis with the AC cord connected to a power source. Only qualified personnel should perform the installation procedures in this manual.

RELATED PUBLICATIONS

The following publications describe the installation of related iSXM products and provide hardware installation and removal procedures for Intel system products. These documents are available from the Intel Literature Department (see page 2 for address).

* iSXM 952 Terminal Communications Installation Guide For System 86/330A Users.

* iSXM 953 Terminal Communications Installation Guide For System 86/380 Users.

* System 86/380 Hardware Reference Manual.

* System 86/330A Hardware Reference Manual.

INTRODUCTION

The iSXM 101 Xenix Extension Module provides an Intel customer having either the System 86/330A or the System 86/380 with the added capability of running the Xenix 86 Operating System. The iSXM 101 Xenix Extension Module consists of an iSBC 309 Memory Management Multimodule board, an 8087 Numeric Data Processor (NDP) Device, and all the associated mounting hardware for installing the module on a host processor board.

The iSBC 309 Memory Management Multimodule is used to map and protect memory in a multiuser environment. The memory mapping scheme is controlled by the Xenix 86 Operating System but implemented with the iSBC 309 board. The 8087 NDP gives the host processor additional math capabilities. This device is used by Xenix 86, Release 2 and any following releases of the Xenix 86 Operating System.

Installing the iSXM 101 Extension Module is relatively simple, and requires about one hour to complete. You should have the following items readily available to you before starting:

1. Hardware reference manual or chassis manual for your particular system.

2. These tools:

   Medium size Phillips screwdriver
   Small size Phillips screwdriver
   3/16-inch nutdriver
   Needlenose pliers
   medium size straight blade screwdriver

INSTALLATION

This section describes how to install the hardware that makes up the iSXM 101 Extension Module into an Intel Microcomputer System. This hardware consists of the following:

- iSBC 309 Memory Management board
- 8087 Numeric Data Processor (NDP) Device
- Mounting hardware
- Revision label for processor board

During the installation procedure, handle all parts with extreme care. Do not subject the 8087 NDP to electrostatic discharge voltages. In addition, the pins on the host board interface connector are easily bent; use caution during the installation step. The following section outlines the correct installation procedure for the iSXM 101 Extension Module.

PROCEDURE

This procedure explains how to install the iSBC 309 board onto the host processor board.

1. Turn system AC power switch to OFF.

2. Disconnect the system AC power cord from the power source.

3. Disconnect any I/O cables installed to the back of the chassis.

4. Refer to your system's hardware manual. Follow the procedure(s) for removing boards from the system cardcage.

5. Locate the processor board in the cardcage. Before removing the processor board, it may be necessary to unplug some of the I/O cables on the other boards in the system as well as the cables on the processor board. If you need to unplug any of these cables ensure that you mark each connector with its appropriate destination location and cable orientation. This will prevent connecting the wrong cable to the wrong connector when re-installing the hardware.

6. After marking the connectors, remove them and carefully remove the processor board.

7. Carefully remove the iSBC 337 module from the processor board. Refer to Figure 1.

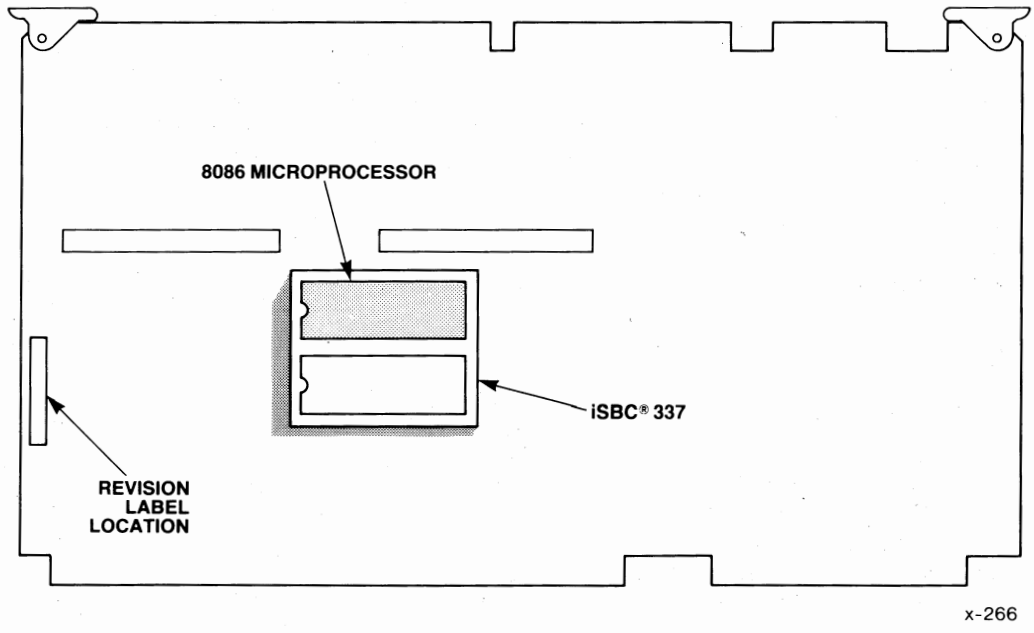

Figure 1. iSBC® 337 Module Location

8. Carefully remove the 8086 device from the iSBC 337 board, and then place the 8086 microprocessor into the 8086 socket (U35) on the iSBC 309 board. The notched end of the 8086 should be facing device U22. See Figure 2.

9. If you choose to install the 8087 device, remove the device from its packaging and install it into the 8087 socket (U34) on the iSBC 309 board. The notched end of the 8087 should be facing device U21. See Figure 2. If you install the 8087 device, you must ensure that your iSBC 86/30 processor board is configured for 5 MHz operation rather than 8 MHz operation. Jumper 36 - 37 on the processor board must be installed for 5 MHz operation. When this jumper is removed, your processor board is configured for 8 MHz operation.

10. Remove the plastic protective cap from the iSBC 309 board interface connector and install the two nylon screws and the two standoffs on the iSBC 309 board. See Figure 3.

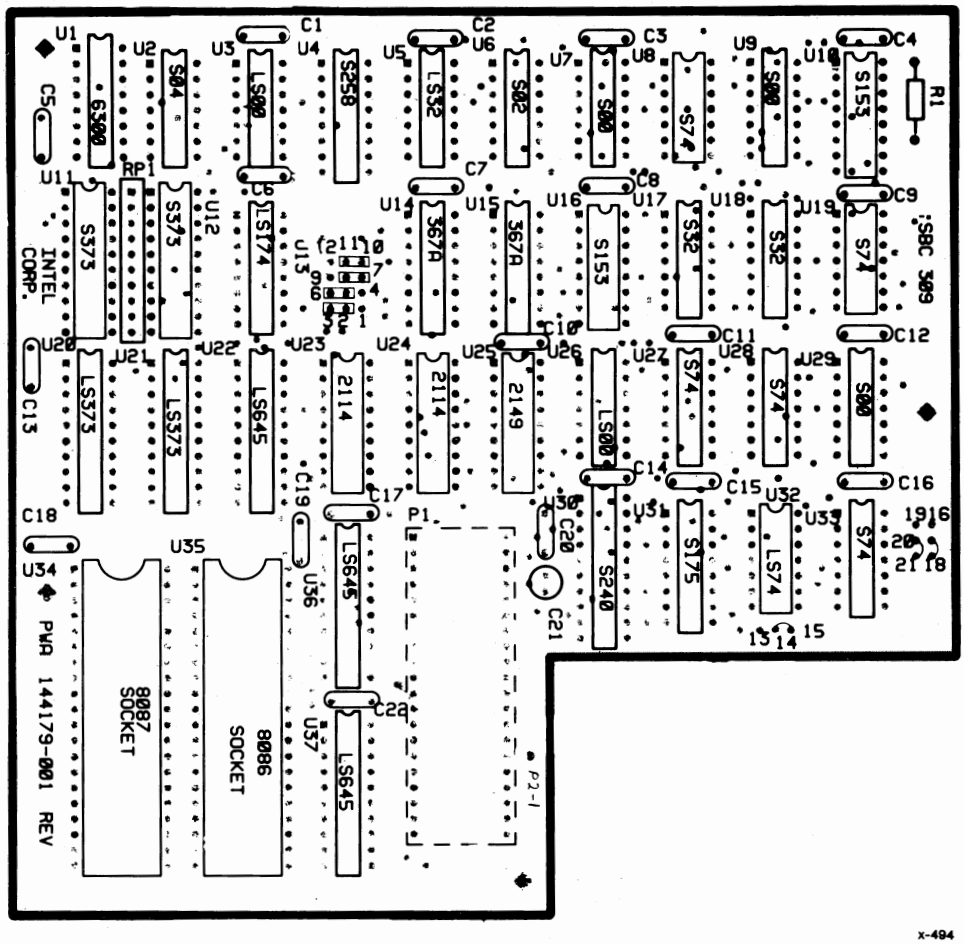

Figure 2. iSBC® 309 Board Socket Locations

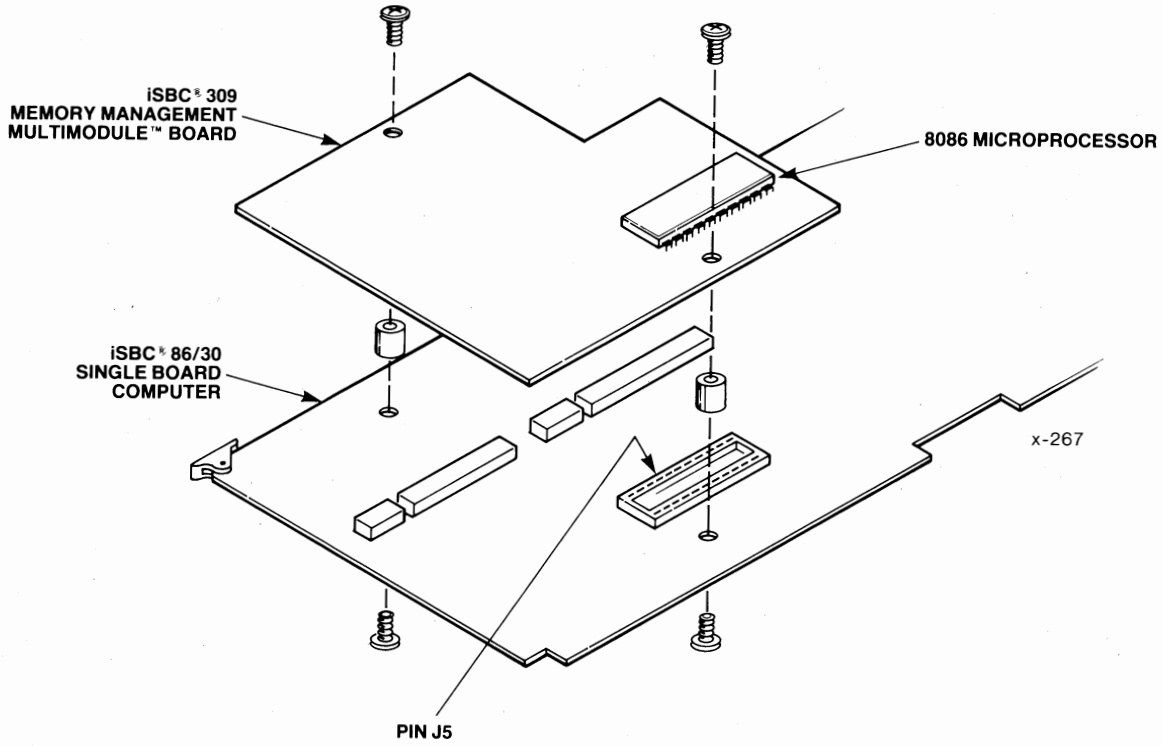

Figure 3. Hardware Mounting Technique

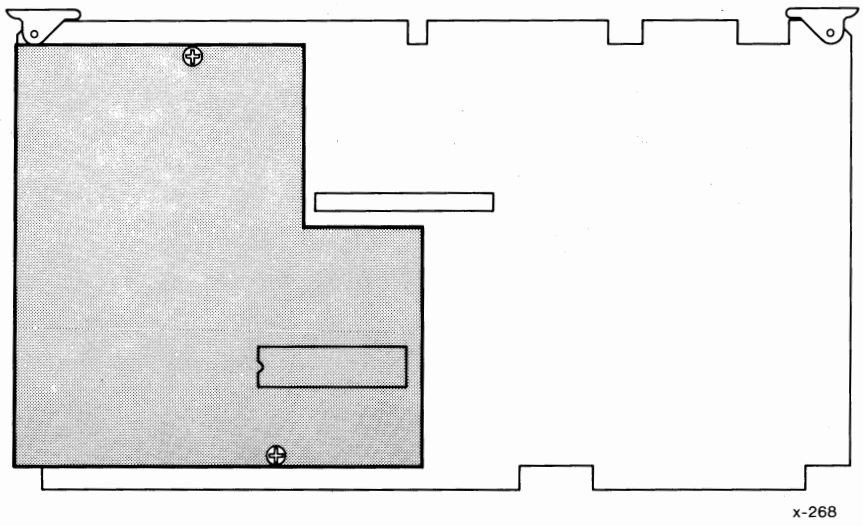

Figure 4. iSBC® 309 Board Installed On The Processor Board

11. Place the supplied revision label over the existing label located on the left side on the processor board. This identifies the new configuration of the processor board. See Figure 1.

12. Line-up pin J5 and the 8086 socket pins on the iSBC 309 board with the single socket and the 8086 socket on the processor board and gently insert the 309 board into place. After confirming that all pins are correctly started, press down on the iSBC 309 board until it seats in place. Insert two nylon screws from the solder side of the processor board into the two spacers and tighten the screws. Figure 4 shows the completed installation.

13. Insert the processor board back into the same slot in the system cardcage. Refer to the hardware reference manual if necessary.

14. If you are installing a Terminal Communications board (iSXM 534 or iSXM 544), go directly to the appropriate section of one of the following manuals:

    iSXM 952 INSTALLATION GUIDE (For System 86/330A)

    iSXM 953 INSTALLATION GUIDE (For System 86/380)

15. If you are installing additional memory at this time, refer to Section 3 of this guide for required jumper configurations.

16. If you are not installing any other hardware into the system at this time, attach all I/O cables to their appropriate connectors on the boards in the cardcage, and assemble the system according to the instructions in the hardware reference manual.

17. If you are installing Xenix 86 software at this time, refer to the instructions which come with the software, or if none exist there, refer to Section 4 of this guide.

18. Install the Xenix Feature Label onto the back of your chassis.

REQUIRED CHANGES FOR MEMORY ADDITIONS

Most Intel 86/300 Series Microcomputer Systems provide 384K bytes of memory. There are several ways to add memory to your system. An iSBC 304 RAM Expansion Multimodule board could be added, providing an additional 128K bytes of on-board memory. Since this additional memory would be on-board memory, system performance is not lowered as it will be when using off-board memory. This addition requires two jumper changes on the processor board and jumper changes on the iSBC 056A RAM Memory board to increment the off-board memory address.

You could add another iSBC 056A RAM Memory board or add both an iSBC 056A RAM Memory board and an iSBC 304 RAM Expansion Multimodule board. Another board that could be added is the iSBC 012B RAM Memory board providing an additional 512K bytes of off-board memory. Any combination of these boards may be used to increase the memory capacity of your system. Table 1 presents a summary of some of the possible combinations using these boards to increase the size of your system's memory capacity. Table 1 also refers to other Tables (Tables 2 through 11) that list the jumper changes to make. Tables 2 through 11 list the jumper changes required for the different memory address configurations.

Table 1. Summary of Memory Additions

Memory Added	iSBC® Memory Board(s) Added		Table Reference To Use To Make Change
128K	304		Tables 2 and 5
256K	056A		Table 4
384K	056A	304	Tables 2, 3, and 5
256K*	012B		Table 6
512K	012B		Table 8
384K	012B	304	Tables 5 and 7
640K	304	012B	Tables 2, 5, and 9
740K	012B	056A	Tables 6 and 10

* To add this amount of memory, you must remove the iSBC® 056A board.

Table 2. iSBC® 056A Board Address 40000H to 7FFFFH

Jumper	Remove	Install
E79 to E82	X	
E79 to E81		X

Table 3. iSBC® 056A Board Address 80000H to BFFFFH

Jumper	Remove	Install
E79 to E80		X
E123 to E127	X	

Table 4. iSBC® 056A Board Address 60000H to 9FFFFH

Jumper	Remove	Install
E79 to E82		X
E79 to E81		X
E123 to E127	X	

Table 5. iSBC® 86/30 Board Jumper Changes When iSBC® 304 Is Added

Jumper	Remove	Install
E119 to E120		X
E232 to E233	X	

Note: Remove PROMs in location U45 and U46 on the iSBC® 86/30 board and replace with PROMs shipped with the iSBC® 304 board.

Table 6. iSBC® 012B Board Changes For Address Range 20000H to 9FFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28		X
29	X	
30	X	
31	X	
32	X	
17		X
18		X
19		X
20	X	
21	X	
22		X
23	X	
24	X	

Table 7. iSBC® 012B Board Changes For Address Range 40000H to BFFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28	X	
29		X
30	X	
31	X	
32	X	
17		X
18		X
19		X
20		X
21	X	
22		X
23	X	
24	X	

Table 8. iSBC® 012B Board Changes For Address Range 60000H To DFFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28		X
29		X
30	X	
31	X	
32	X	
17		X
18		X
19		X
20	X	
21		X
22		X
23	X	
24	X	

Table 9. iSBC® 012B Board Changes For Address Range 80000H To FFFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28	X	
29	X	
30		X
31	X	
32	X	
17		X
18		X
19		X
20		X
21		X
22		X
23	X	
24	X	

Table 10. iSBC® 012B Board Changes For Address Range A0000H To FFFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28		X
29	X	
30		X
31	X	
32	X	
17		X
18		X
19		X
20		X
21		X
22		X
23	X	
24	X	

Table 11. iSBC® 012B Board Changes For Address Range C0000H To FFFFFH

Jumper	Install	Remove
25	X	
26	X	
27	X	
28	X	
29		X
30		X
31	X	
32	X	
17		X
18		X
19		X
20		X
21		X
22		X
23	X	
24	X	

XENIX 86 INSTALLATION

This section provides the information necessary to install the Xenix 86 Operating System. All of the documentation necessary to create your own Xenix 86 libraries, directories, and files along with the Xenix 86 Operating System software (which is contained on several diskettes) are shipped as a package. Each diskette is labeled and should be copied from the flexible disk drive onto the Winchester disk. Table 12 lists the name on the label affixed to each diskette and the number of diskettes with that label.

Table 12. Diskette Labels

Label	Number of Diskettes	Content
Bootstrap program	1	This diskette contains the bootstrap program and must be "write-enabled" (tab on for 8-inch diskettes).
root files	3	These diskettes contain the following root directories: bin, sys, etc.
user files	2	These diskettes contain the user files and directories.
manual files	1	This diskette contains the manual files and directories.
user documents	2	These diskettes contain the Xenix 86 user documents.

To install the Xenix 86 Operating System onto the Winchester disk from the flexible diskette, perform the following steps:

1. With the system turned ON insert the diskette labeled Bootstrap Program into the flexible disk drive.

2. Press the RESET pushbutton.

3. Wait for the asterisks to appear across the screen, then enter an uppercase U. This stops the display of the asterisks and invokes the System Confidence Test (SCT).

4. When the PIC test of the SCT prompts for an input, press the INTRPT pushbutton on the front panel of the system.

5. The following appears on the screen:

   BREAK at xxxx.yyyy and a . (period) prompt.

6. Enter:

   b :wf0:xenix.gen (This tells the monitor that the flexible disk drive (wf0) contains the generic Xenix Operating System.)

NOTE

If you type the wrong character, it may be erased with the delete or Rubout key.

7. The Xenix 86 Operating System checks the base addresses of several devices and displays results similar to the following:

```
iSBC 215 @ WUA 0100 Level 5 found
iSBC 534 Based 0030 board 0 found
iSBC 534 Based 0040 board 1 not found
Console Data   00D8 Timer 2 found
LP Based       00C8 level 4 found

mem = 284K (This is the amount of free space left for the
           user.  The amount varies dependent on the memory
           size and the configuration of the drivers.)
```

- or -

```
iSBC 215 @ WUA 00100 Level 5 found
iSBC 544 Based 0E000 board 0 found
iSBC 544 Based 0E400 board 1 not found
iSBC 544 Based 0E800 board 2 not found
iSBC 544 Based 0EC00 board 3 not found
Console Data   000D8 Timer 2 found
LP Based       000C8 level 4 found

mem = 284K (This is the amount of free space left for the
           user.  The amount varies dependent on the memory
           size and the configuration of the drivers.)
```

8. The prompt "<bootsys>" appears. The erase character is the backspace character, (value 08 Hex). To stop and restart the output on your terminal, you can use Control S (value 13 Hex) and Control Q (value 11 Hex), respectively. The interrupt character (which is typically Control C) is the delete character (value 7F Hex).

9. Enter the following to format and initialize the Winchester disk and install a copy of the Xenix 86 Operating System onto the Winchester disk.

```
/etc/mksys

Where: etc is a directory

       mksys - formats and initializes the Winchester disk.
```

10. The following prompt appears:

    ABOUT TO INITIALIZE PRIAM DRIVE, Ok?

    Priam - is the type of Winchester disk drive in the System 86/330A or System 86/380.

11. Enter a lower case y. (If you enter any character except a lower case y, the initialization sequence aborts.)

12. At this point, no further input is required.

13. The screen displays a series of information as the Winchester drive is formatted. After about 5 minutes, the screen displays the following:

    ```
    Formatted 2550 tracks: 0 thru 2549, interleave 4
    Making root file - system...
    ```

    Several parameters are then displayed followed by:

    ```
    Making remainder file-system...
    ```

    Several more parameters are then displayed followed by:

    ```
    Mounting  /dev/w0a on /mnt...
    Copying...
    /Xenix...
    /bin...
    ```

    All the utilities needed to install the remainder of the Xenix 86 system are automatically copied onto the Winchester drive.

    When the following display appears, the nodes (which are the standard device entry points into the Xenix 86 operating system) are created.

    ```
    Making /dev...
    ```

    It takes about 3 minutes to make the device directory on the Winchester disk. This is followed by a message:

    ```
    Installing mksys routines on wini...
    ```

14. When the disk initialization is complete, the HALT LED lights and the following appears on the CRT:

    ```
    **  NORMAL SYSTEM SHUTDOWN **
    ```

15. Open the disk drive door and press the RESET pushbutton.

NOTE

Read the next step carefully before proceeding. You have 6 seconds after entering an uppercase U to respond to the PIC test prompt by entering an I or an error occurs.

16. Enter an uppercase U when the asterisks start appearing on the attached monitor. This stops the display of the asterisks and invokes the SCT test. Enter an uppercase I in response to the PIC prompt of the SCT. The SCT test continues and then the Xenix 86 Operating System is bootstrap loaded from the Winchester drive.

    If an error occurs during the SCT test, refer to the SYSTEM 86/300 SERIES DIAGNOSTIC MAINTENANCE MANUAL to determine the probable cause. After solving the problem, repeat the installation procedure from step 1.

17. The Xenix 86 Operating System checks the base addresses of several devices and displays the results as previously described in step 7.

18. After bootstrap loading the Xenix 86 Operating System from the Winchester drive a "#" prompt appears. Install the rest of the Xenix 86 Operating System to the Winchester drive by entering the following:

    ```
    /etc/mksys
    ```

19. The message appears:

    ```
    Checking previously installed filesystem...
    ```

20. The Xenix 86 Operating System performs a file system check and reports the results as follows:

    ```
    ** PHASE 1 - Check Blocks and Sizes
    ** PHASE 2 - Check Pathnames
    ** PHASE 3 - Check Connectivity
    ** PHASE 4 - Check Reference Counts
    ** PHASE 5 - Check Free List
    ```

    The screen also displays the number of file blocks that are free.

21. If any file system problem is reported, repeat steps 1 through 20. If the problem persists, call your local Intel Field Applications Engineer (FAE) or your local service representative.

22. The message appears:

    Creating standard directories. This is followed by a list of created directories which are preceded by a slash.

    When you are prompted to insert a diskette and you make a mistake, (i.e. type a carriage return before inserting the diskette), there is no reason to be concerned. The /etc/mksys routine may be re-invoked as many times as necessary to accomplish the installations. The error message,

    tar: cannot create/dev/rdf0

    may appear if you leave the door open on the diskette drive, or if you insert the diskette upside down.

23. The following prompt appears:

    Insert the diskette labeled Root 1 of 3 and type a <cr>

24. Remove the bootstrap diskette and insert the diskette labeled Root 1 of 3 first and enter a <cr>.

    The contents of the diskette are copied onto the Winchester disk. The name of each file copied is displayed. Ignore such messages as those listed below. There is no problem, those files cannot be created because they already exist and are currently being executed by Xenix 86.

    /bin/sh - cannot create
    /bin/tar - cannot create
    /etc/init - cannot create

25. When the copying operation stops, the following prompt appears:

    Insert diskette Labeled "Root 2 of 3' and type a <cr>.

26. Remove the diskette installed in the floppy drive and install the next diskette. After each diskette is inserted, type a <cr> to copy the contents from the diskette onto the Winchester disk:

27. After all three diskettes labeled Root are copied onto the Winchester disk, copy the two diskettes labeled User from the floppy, followed by the diskette labeled User Manual and then the two diskettes labeled User Documents.

28. After all the diskettes have been copied, the following prompt appears:

"Is there an upgrade yet?" If there is an upgrade, enter a Y (or yes). A message appears asking you to insert the diskette and enter a <cr>.

29. After your appropriate response to step 28, the following prompt appears:

    "Do you wish to setup Learned scripts?"

30. Enter a y or yes if you want the learned scripts. If not, enter a n.

    The learn scripts are formatted and several messages are displayed.

31. Next, the following prompt appears:

    "Do you want the iSBC 534 setup for Login?"

32. Enter a y or yes if you want the Login capability.

    This activates the entries in the /etc/ttys file and turns on login lines for the first iSBC 534 board at 9600 baud.

    You now have the Xenix 86 operating system installed and a message highlighting this appears followed by a screen of useful information about the system.

33. To find what your control characters are, enter the following:

    stty <cr>

34. Refer to the Microsoft Corporation Xenix manuals supplied with the software for any additional information required to create your libraries, files, directories, etc.

Perform steps 35 through 40 to enable the multiuser mode.

35. Turn on any additional terminals and set each for 9600 baud.

36. Enter a Control D to exit the Xenix 86 single user mode and bring Xenix 86 system up in the multiuser mode.

    The system prompts with:
    login:

37. Enter characters xxx followed by a <cr>. The characters entered should be echoed on the screen.

38. System responds with the following prompt:

    password:

39. Enter characters xxx followed by a <cr>. The characters entered are not echoed on the screen.

40. System responds with the following:

    login:

41. Repeat steps 37 through 40 for each terminal attached to the terminal communications board.

    This verifies that all the terminals are responding to the Xenix 86 system.

* * * * *

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